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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/724,713      | 12/02/2003  | Yoshihiro Ikoma      | 65933-055           | 2215             |

7590 07/19/2006

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Washington, DC 20005-3096

| EXAMINER |
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CHUO, TONY SHENG HSIANG

| ART UNIT | PAPER NUMBER |
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1745

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/724,713

**Applicant(s)**

IKOMA, YOSHIHIRO

**Examiner**

Tony Chuo

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                              |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                                             | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/13/06</u> . | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 1-16 are currently pending in this application. The objection to the specification is withdrawn. Claims 1-16 do not overcome the previously stated 102 and 103 rejections. Therefore, claims 1-16 stand rejected under the previously stated 102 and 103 rejections.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 4/13/06 was filed on 4/13/06. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 and 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Terazono et al (US 2002/0009626). The Terazono reference teaches a fuel cell comprising an anode electrode, a cathode electrode, and a solid polymer electrolyte membrane between the electrodes wherein the cathode comprises a gas diffusion layer such as carbon paper or carbon cloth and a catalyst layer formed over the gas diffusion

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layer. In addition, it also teaches a catalyst layer comprising a first carbon particle, carbon black that has a hydrophilic surface, a platinum metal supported on the carbon black, an ion exchange resin made of a copolymer, and a second carbon particle, a graphitized carbon black that has a water repellent surface (See paragraphs [0008],[0039],[0042]). Further, the graphitized carbon black has an average value of lattice spacing of the [002] plane,  $d_{002}$ , of 0.344 nm and a crystallite size in a direction of c-axis,  $L_c(002)$ , of 6.0 nm (See paragraph [0051]).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5-8 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terazono et al (US 2002/0009626) in view of Koschany et al (US 6451470). The Terazono reference is applied to claims 1-4 and 9-12 for reasons stated above.

However, the reference does not expressly teach a gas diffusion layer that includes a first carbon particle and a second carbon particle. The Koschany reference does teach a gas diffusion layer that includes a carbon fiber nonwoven fabric filled with graphite (See column 4, lines 16-33 and column 5, lines 54-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Terazono fuel cell to include a gas diffusion layer that is filled with graphite, so that

the effective diffusion constant for reaction gases is sufficiently high while the effective diffusion constant for water is sufficiently low.

### ***Response to Arguments***

7. Applicant's arguments filed 6/15/06 have been fully considered but they are not persuasive. In response to the applicant's argument that Terazono et al does not disclose two type of carbon particles, the carbon support disclosed by Terazono et al consists of carbon black and graphite which are two type of carbon particles. In response to the applicant's argument that Terazono et al does not disclose catalyst supporting carbon particle that is hydrophilic, Terazono discloses that increasing the degree of graphitization, increases the water repellency of the carbon support. Therefore, the carbon black has to be hydrophilic because it does not become water repellent until it becomes graphitized. Further, the carbon support which consists of carbon black and graphite is dispersed in water so the carbon black has to have some degree of hydrophilicity. In response to the applicant's argument that the water-repellent carbon particle is provided separate from the catalyst supporting carbon particle, Terazono et al discloses that if the degree of graphitization of the carbon support is too high, the specific surface area decreases whereby the dispersibility of the metal catalyst to be supported tends to decrease or the surface area of the catalyst to be supported tends to decrease and consequently, the electrode activity tends to decrease (See paragraph [0015]). Since the carbon support consists of hydrophilic carbon black and hydrophobic graphite, increasing the amount of graphite will decrease surface area of the carbon black that is supporting the catalyst. Therefore, the catalyst

will tend to be supported on the hydrophilic high surface area carbon black and not the graphite. Since Terazono discloses a carbon support with the same degree of graphitization as shown by the same lattice spacing of the [002] plane, there is no functionally significant structural differences between the claimed invention and Terazono et al.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

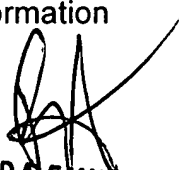
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC



RAYMOND ALEJANDRO  
PRIMARY EXAMINER